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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/591,449	09/01/2006	Yuji Aoki	AOKI3008/GAL/PMB	1641

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EXAMINER	
WOOD, JARED M	

ART UNIT	PAPER NUMBER
1793	

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08/31/2010	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/591,449	AOKI ET AL.	
	Examiner	Art Unit	
	JARED WOOD	1793	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *17 June 2010*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,11,12,18,27 and 28* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,11,12,18,27 and 28* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

The examiner acknowledges receipt of the response filed 06/17/2010. Claims 2-10, 13-17, and 19-26 are cancelled. Claims 1, 11-12, 18, and 27-28 are currently pending for examination.

Claim Objections

Claims 1 and 12 are objected to because of the following informalities: claims 1 and 12 both cite "one or more solid solution elements capable of forming a solid solution with cerium and selected from the group consisting of…". In order to readily set forth that these elements consist of the viable solid solution formation elements, it is recommended that applicant append the listing of claimed elements directly after the term "solid solution formation elements". Appropriate correction is required.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* v. *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.

4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1, 11, and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent No. 6,764,770 by Paranthaman et al, in view of US Patent Pub. No. 2004/0157747 by Chen et al.

With respect to claim 1, Paranthaman teaches a rare earth superconductor device comprising a metal substrate, an intermediate buffer layer containing an oxide of Mn along with at least one element of Ce Y, Nd, Sm, Gd, Eu, Yb, Ho, Tm, Dy, and Er, a cerium oxide layer, and a surface layer of REBa2Cu307 (e.g., YBCO) or other superconductor (claim 6 and figure lb).

Paranthaman does include a teaching for intermediate layers where cerium is paired with a solid solution formation element (Y, Nd, Sm, Gd, Eu, Yb, Ho, Tm, Dy, La, and Er) (see paragraph above); however, Paranthaman is silent with regards to a layer with cerium being paired with a charge compensation element (Bi, Nb, Sb, Ta, and V) in an oxide form.

Chen is drawn to a superconducting product comprising a metallic substrate, a high Tc superconductor layer, and doped metal oxide buffer layer(s) (claim 1 and ¶ 0041). The buffer

layer is further defined to comprise cerium oxide doped with possibly a transition metal oxide (such as Nb, Ta, or V), a lanthanide metal oxide (such as 8m203, Y203, or Gd203), or combinations thereof (claims 7-8). Chen discloses that such a buffer layer provides improved property matching between the superconductor layer and the metallic substrate which results in the reduction of or absence of cracking in the buffer layer (¶ 0016 and 0044).

Both Paranthaman and Chen are drawn to similar superconducting articles, containing a metal substrate, intermediate layer, and superconducting layer, with intermediate layers consisting of cerium-based oxides being a preferred embodiment. At the time of invention it would have been obvious to a person of ordinary skill in the art to perform the process of Paranthaman with cerium oxide intermediate layers containing a solid solution formation element, a charge compensation element, or both, in view of the teaching of Chen. The suggestion or motivation for doing so would have been to improve property matching between superconductor layer and metal substrate as well as to prevent cracking (Chen, ¶ 0044 and 0016).

With regards to the limitation of critical temperature of the rare earth oxide superconductive layer, MPEP 2112 [R-3] states that, "[T]he discovery of a previously unappreciated property of a prior art composition, or of a scientific explanation for the prior art's functioning, does not render the old composition patentably new to the discoverer." The critical temperature range of 85-88° K is not patentable, as such a property would be present in the prior art of record.

Chen teaches a superconductor with solid solution formation elements, charge compensation elements, and combinations of the two (claims 7-8). The detailed embodiment is through Sm, a solid solution formation element, and gives a Sm concentration of 1% to about

35% in terms of the metal content (claim 9 and paragraph 0036). In MPEP 2144.05 [R-5] Obviousness of Ranges, "In the case where the claimed ranges 'overlap or lie inside ranges disclosed by the prior art' a prima facie case of obviousness exists," and thus, covers 5 to 60 mol%. As Chen discusses the use of charge compensation elements but gives the example of Sm to represent all the possibilities, it is inherent to use similar concentrations for charge compensation elements and combinations thereof.

With respect to claim 11, both Paranthaman and Chen teach a superconductor where the metal substrate is a biaxially aligned metal substrate (see Paranthaman, claim 6, and Chen, claim 2).

With respect to claim 27, the references as combined disclose such a limitation, as both Paranthaman and Chen disclose a superconductor with a solid solution formation element being Gd (Paranthaman, claim 6, and Chen, claim 8) while Chen discloses a superconductor with a charge compensation element being Nb, Ta, or V (claim 7).

Claims 12, 18, and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent No. 6,764,770 by Paranthaman et al, in view of US Patent Pub. No. 2004/0157747 by Chen et al, and further in view of US Patent No. 5,444,040 by Kojima et al.

With respect to claims 12 and 18, Chen provides a method for making a rare earth oxide superconductor including depositing a doped cerium based oxide, biaxially textured, buffer layer on a metallic substrate followed by forming an HTS layer on top of the buffer layer. The depositing step can be any process designed to form thin films, including pulsed laser deposition

(PLD), sputtering, physical vapor deposition, metal organic chemical vapor deposition (MOCVD), metal organic deposition (MOD) or mixtures or combinations thereof (¶ 0019). Metal substrates include Ni and alloys (¶ 0035), and the reference specifies Sm- doped (0.01-0.35%) CeO2 (¶ 0040 and 0053). The reference specifically or inherently meets a majority of the claimed limitations. Furthermore, Chen provides the several options for depositing layers, one of which is metal organic deposition, or MOD (¶ 0019, 0040).

Together, Paranthaman and Chen do not teach a heat treatment (or calcination) step in the range of 900 to 1,200° C.

Kojima is drawn to the method of making a YBCO superconductive oxide single crystal, including a step of calcining the material at 800 to 950° C, with further heat treatment reaching but not passing 1,200° C (claim 1). MPEP 2144.05 [R-5] Obviousness of Ranges states, "In the case where the claimed ranges 'overlap or lie inside ranges disclosed by the prior art' a prima facie case of obviousness exists."

At the time of invention it would have been obvious to a person of ordinary skill in the art to perform the process of Paranthaman and Chen with a heat treatment temperature range of 900 to 1,200° C, in view of the teaching of Kojima. The suggestion or motivation for doing so would have been to provide an optimal growing temperature for sufficient melting and film formation (Kojima, column 6, lines 10-14).

With respect to claim 28, the references as combined disclose such a limitation, as both Paranthaman and Chen disclose a superconductor with a solid solution formation element being Gd (Paranthaman, claim 6, and Chen, claim 8) while Chen discloses a superconductor with a charge compensation element being Nb, Ta, or V (claim 7).

Response to Arguments

Applicant's arguments filed 06/17/2010 have been fully considered but they are not persuasive. On page 8, applicant states that the elements are no longer in their ionic state (i.e. necessarily in their elemental state). The examiner is unclear how applicant has arrived at this determination. The examiner has discovered no support in the specification for such a determination. In contrast the specification and the claims both identify that after the superconductor structure is completely formed, the cerium is in the form of an oxide (e.g. ionic state). Since the cerium and respectively each of the solid solution formation element and the charge compensation element are applied as mixed organometallic precursors and calcined, it would be expected that the solid solution formation element and the charge compensation element would each likewise be in oxide form along with cerium in the final structure. The examiner has determined that the reducing atmosphere applied during heat treatment would only be expected to prevent oxidation of the already metallic substrate.

Applicant has further argued that the disclosure of Paranthaman fails to include the possibility of a buffer layer which comprises cerium and a solid solution formation element. But rather must be only Mn, Ce, and one of Be, Mg, Ca, Sr, Ba, and Ra. While this is the case in the embodiment of the formula disclosed in claim 6 being $R_{1-x}A_xMnO_3$ where A is specifically identified to represent one of Be, Mg, Ca, Sr, Ba, and Ra, it is not the only disclosed embodiment. In the alternate formula disclosed in claim 6, $RMnO_3$, R is claimed to comprise at least one element selected from the group consisting of Ce, Pr, Nd, Pm, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb, Lu, and Y. Thus, R may represent Ce and any one of Nd, Sm, Eu, Gd, Dy, Ho, Er,

Tm, Yb, or Y. Essentially, for example the formula may read: $Ce_xGd_{1-x}MnO_3$ where x may be any number from 0-1. Or in other words a Ce or Gd molar percent of 0-50% for the layer based on the metal content of the layer.

Applicant further argues that Paranthaman fails to disclose the two layered structure comprising each of the limitations of claim 1. Likewise, applicant makes a similar argument in reference to the disclosure of Chen. In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.,* 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

As to any arguments involving Chen's failure to disclose features of the first intermediate layer, Chen is not relied upon for any features of the first intermediate layer. Chen is only relied on to provide disclosure as to doping the CeO_2 layer, disclosed by Paranthaman and relied upon by the examiner, with a transition metal oxide (i.e. based upon Nb, V, or Ta).

Applicant further argues on page 11, that Chen is insufficient to disclose a solid solution formation element and charge compensation element composition in the layers of 5-60% based upon the total metal content of the layers. However, while not previously expressly pointed out by the examiner the solid solution formulation element content in the first intermediate layer based upon the total metal content of the layer must be 0-50%. This combined with Chen's 1-35% composition in the second layer as expressly pointed out by the examiner surely overlaps applicant's claimed range.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JARED WOOD whose telephone number is (571)270-5911. The examiner can normally be reached on Monday - Friday, 7:30 am - 5:00 pm, EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jerry Lorengo can be reached on (571)272-1233. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/JARED WOOD/
Examiner, Art Unit 1793

/Emily M. Le/
Supervisory Patent Examiner, Art Unit 1793